SAND2016-6429R

China

SLAT Plan Template
Site Name, City, Country

Version x.x

Date

Author (s), Department, Organization

Contact Info

Table 1 Revision Table

Rev 0.0,	Initial draft.
Rev 1.0, Date, Reviser name	Final revision for distribution.

i.Table of Contents

ii.References (site specific)

1. *Conceptual Design Document, Site Name, City, Country*, Version x.x, date, including all applicable addenda.
2. Site Contract documents
3. Nuctech Documents (most current version):
    a. *RPM Factory Acceptance Test Plan*
    b. *RPM Field Acceptance Test Plan*
    c. *Software Factory Acceptance Test Plan*
    d. *Construction Acceptance Test Plan*
    e. *OCR and Auxiliary Equipments Acceptance Test Plan*
    f. *Network System Field Acceptance Test Plan*
    g. *Total System Field Acceptance Test Plan*
4. *Other applicable reference documents*

iii.Glossary (modify to fit local conditions)

Alarm: An alarm is a particular type of event raised in the central alarm station (CAS) system that requires immediate action/attention by system operators in accordance with the workflow defined for the system.

Alert: An alert is a notification issued by the CAS system intended to bring the attention of system operators to a particular event. Alerts can come in the form of pop-up windows, audible tones, and/or visual cues such as flashing, colored entries in the event queues. Which forms are displayed depends on how the system is configured.

Central Alarm Station (CAS): A CAS is a central control location where the evaluation of alarms and events for a given collection of terminals, control points (CPs), and inspection sites are undertaken by designated host-country staff.

CAS System: See CAS system.

CAS Workstation: A CAS workstation is a computer workstation located at a CAS location that is used by host-country staff to access the CAS system. There will be x-number of CAS workstations at Site Name.

Event: An event in the CAS system occurs when one of the monitoring devices (e.g. RPMs, cameras) sends a message associated with a particular event as its trigger. In addition, CAS system events can be triggered by system objects such as status-of-health (SOH) monitoring components. Events can include radiation alarms, radiation faults, and tamper faults generated by the RPMs as well as SOH faults such as camera faults or RPM faults generated by the CAS SOH component.

Exit Verification Subsystem (EVS): EVS workstations will be located at the exit gate near the SIS to prevent vehicles from bypassing the SIS before alarms are cleared by the CAS and at Site Customs Checkpoint Office adjacent to the export side of the Export Traffic Control Gate Tier 2. The EVS locations will include OCR systems and a workstation.

False Alarm: An alarm that is not the result of radiation in the area. The alarm is caused by random cosmic radiation or by an equipment problem.

Fault Alarm: A type of event generated when an unusual equipment condition is detected.

Gate: An access point (entry and/or exit) to a particular site. This term is commonly used to describe an access point to a shipping terminal. Typically a gate will have one or more lanes with traffic passing through.

Innocent Alarm: A radiation alarm caused by a legal radioactive material or cargo containing naturally occurring radioactive material.

Local Alarm Station (LAS): A LAS is the location at a terminal gate where the terminal alarm and event processing activity assigned to the staff at these gates is undertaken. At Site Name, three LAS workstations will be located at the Site Customs Checkpoint Office adjacent to the export side of the Export Traffic Control Gate Tier 1. Typically, LASs are located at terminal exit gates primarily to ensure that container traffic that causes an alarm is halted prior to departure from the terminal area. The LAS staff will then follow directions provided by the CAS operators regarding further processing such as sending the traffic to the SIS or releasing the traffic.

LAS Workstation: A LAS workstation is a computer workstation located at each LAS location and is used by staff members who are assigned LAS roles to access the CAS system.

Los Alamos National Laboratory (LANL): A U.S. DOE laboratory responsible for radiation detection equipment used by the Second Line of Defense (SLD) Program.

CAS System: The CAS system (or "communications system") provides those capabilities required to accept, process, display and store data from RPMs; provide images to support alarm and fault event resolution; and to provide interfaces allowing the CAS system users to effectively manage the alarm/event processing (i.e. respond to alarm and fault events) and to assess the status of the sites supported by the system.

National Nuclear Security Administration (NNSA): A separate organization within DOE responsible for security of special nuclear and radioactive materials. NNSA leads the SLD Program.

Nuctech: The general contractor responsible for providing design, integration, construction, communications, and engineering services for the system at Site Name, City, Country. Nuctech is also the manufacturer that provides the RPMs.

Occupancy: Also known as a primary inspection, occurs when a train, vehicle or pedestrian passes through a system sensing device, typically a RPM, triggering it to record data that pertains to the occupant.

Optical Character Recognition (OCR): The transformation of a graphical image (e.g. photograph) into electronic text. For the , this definition has been assigned to an OCR system that is used to capture the front, side, and rear identification numbers on a container and to send them to the CAS for identifying the container that has caused an alarm. The OCR system also communicates its confidence that the number has been identified correctly. The CAS operator can (and should, in the case of low confidence factors) check the OCR conversion by calling up one or more photographs from the lane cameras.

Pacific Northwest National Laboratory (PNNL): A U.S DOE laboratory that is responsible for project management in the SLD Program.

Pillar: A pillar, primary and/or subordinate, is the major sub-unit of an RPM that contains the actual radiation sensors, occupancy sensor, and speed sensor.

Primary Inspection Site: A primary inspection site is the location where people, vehicles, or railcars pass through sensor devices such as RPMs that detect any nuclear related materials.

Radiation Portal Monitor (RPM): The term RPM is used to refer to the sensor device installed at a control point through which, traffic passes. Typically these devices are fixed radiation monitors with one or more pillars, usually a primary pillar and a subordinate pillar. RPMs are installed in each of the 17 export lanes as well as 1 installed at the SIS.

Radiation Alarm: An event generated by an RPM when the level of gamma or neutron radiation exceeds the configured threshold level during an occupancy.

Radiation Fault: An event generated by an RPM when the level of gamma or neutron radiation exceeds the configured threshold level when the RPM is unoccupied.

Radio Isotope Identification Device (RIID): A hand-held instrument that allows the operator to scan a person, vehicle, container, or rail car and identify the radioactive isotope that caused the RPM to alarm.

Sandia National Laboratories (SNL): A U.S. DOE laboratory responsible for system design, system-level acceptance testing (SLAT) and preparing the SLAT report in the SLD Program.

Secondary Inspection: A secondary inspection is the examination of traffic of interest with the purpose of identifying the location and type of radiation already detected by an RPM. It is an in-depth process performed utilizing a hand-held radiation detector or RIID.

Local Customs: The operator of the system at Site Name. Once the system becomes operational, Local Customs will man the CAS 24/7. Local Customs will provide operators to assist with SLAT.

City Port Operator Name: The operator of Site Name, with full responsibility for operations on the port.

Secondary Inspection Site (SIS): A SIS is the site where people, vehicles or cargo that generated an alarm event have a secondary inspection conducted by staff assigned this role

Secondary Workstation (SWS): A SWS is the computer workstation that is used by the staff conducting the secondary inspection to update the CAS system with secondary inspection assessments and results.

Shanghai Institute of Measurement and Testing (SIMT) (or other group, NIM or COE for example): Nuctech subcontractor that is required to handle and deal with radioactive sources. (Calibration and Alignment)

Simultaneous Alarms: The term "simultaneous alarms" is used to describe the scenario where more than one alarm is raised (from multiple RPMs) at the same time in the CAS system. The CAS system must be able to properly prioritize, queue and track all of the alarms.

System Level Acceptance Test (SLAT): Formal testing of the integrated system. The purpose of SLAT is to verify that the system is capable of executing the mission of Customs. Additionally, it forms the basis for evaluating contractor performance to verify that DOE/NNSA has received a fully functioning system, as defined in approved design documents.

SOH Event or Alarm: An event generated by the system to indicate that there is a problem with the system that may affect proper operation. Examples are loss of communication between the computer and a portal, loss of communication between a camera and the computer, camera failure, loss of power, etc.

Tamper Alarm: A tamper alarm is raised when the access doors to an RPM are opened, power is lost at the RPM (and it has to switch to backup power), or the RPM backup power charger output drops below minimum required levels. If the CAS system includes limit switches (i.e. sensors detecting open/closed conditions) on doors, gates, etc. then an 'open' condition in the limit switch also generates a tamper alarm.

Yard Management System (YMS): The YMS (or "terminal operating system" [TOS]) is the software system utilized by terminal operators to support their operations. This includes tracking containers, developing loading plans for ships, etc.

iv. Abbreviations and Acronyms (Modify to local conditions or delete if not needed)

The table below provides a list of the abbreviations and acronyms used in this document and their descriptions.

Abbreviations and Acronyms

Abbreviation/ Acronym	Description
CAS	Central Alarm Station
CDD	Conceptual Design Document
CONOPS	Concept of Operations
CONUS	Continental United States
CP	Control Point
DOE	Department of Energy
LANL	Los Alamos National Laboratory
LAS	Local Alarm Station
OCR	Optical Character Recognition
PNNL	Pacific Northwest National Laboratory
RIID	Radio Isotope Identification Device
RPM	Radiation Portal Monitor
SIS	Secondary Inspection Site
SLAT	System Level Acceptance Testing
SLD	Second Line of Defense
SIMT	Shanghai Institute of Measurement and Testing
SNL	Sandia National Laboratories
SOH	State of Health
SWS	Secondary Inspection Workstation
TCP/IP	Transmission Control Protocol/Internet Protocol
TOS	Terminal Operating System
UPS	Uninterruptible Power Supply
VoIP	Voice over Internet Protocol
YMS	Yard Management System

1 Introduction

This document serves as the System-Level Acceptance Test (SLAT) Plan for Site Name, City, Country. This test plan is to provide independent testing of the Radiation Detection System (RDS) installed at Site Name to verify that Customs has been delivered a fully-functioning system as required by all contractual commitments. The system includes all installed hardware and software components. The SLAT plan will verify that separate components are working individually and collectively from a system perspective.

1.1 SLAT Approach

The City project team will conduct SLAT at Site Name. Other independent entities may also be asked to participate in the test as described below.

Detailed and separate testing will be conducted by Nuctech according to their test plans prior to the start of SLAT to verify that their individual components work as required by their design documents and contractual commitments. Upon notice to Customs that all component test plans have been conducted and that component systems (hardware and software) work as specified, there will be a "hands-off" period during which no modifications to the hardware and software in any component of the system will be permitted. The Site Manager will determine the duration of the "hands-off" period. At the conclusion of the "hands-off" period, SLAT will be initiated according to the approved SLAT Plan.

The SLAT will be conducted over the course of approximately five (as long as needed) days under both daylight and night conditions to test hardware and software operability and functionality of all components of the system at Site Name. The SLAT will include testing of all radiation portal monitors (RPMs), lighting, fiber cable, video cameras, hand-held instrument interface, local alarm station (LAS), secondary workstation (SWS), and central alarm station (CAS) systems.

The results of SLAT will be documented in the SLAT Report along with recommendations on work to be completed prior to formal acceptance of the system.

1.2 SLAT Schedule

The SLAT schedule is subject to change by the Test Director in response to field conditions and impacts to the port, but SLAT is currently scheduled to run (insert appropriate dates). A daily schedule and staffing plan are provided in Appendix B. The SLAT daily and hourly schedule will be established by the Test Director. A detailed schedule for each day has not been established for this plan since the schedule will depend on many factors that can only be evaluated during the SLAT process including what testing must be performed at night. (Detailed schedule may be used)

1.3 Criteria for SLAT Readiness

The prerequisites and SLAT completion criteria are discussed in this section. The project team, with Customs approval, may initiate SLAT or portions of SLAT before all of the SLAT prerequisites have been completed in order to meet schedule and other pressures. In those cases, it is imperative that the incomplete SLAT prerequisites be monitored by the project team and be confirmed as completed.

1.3.1 SLAT Prerequisites

These are the activities that should be completed and the criteria that should be met prior to initiating SLAT. Any activity not completed or criteria not met should be managed as a higher than normal risk as they have higher than normal potential to impact schedule, cost, and quality.

1. System Complete – All construction, installation, system integration, and final contractor system-level testing is completed. A written notice of completion has been provided to Customs from the contractors. The written notice includes all known system deficiencies and incomplete items.

2. Spare Parts – Spare parts are at a secure location near the site and are available.

3. Maintenance – Capabilities (e.g., contracts) for both preventative and emergency maintenance are in place.

4. Sources – Radiation sources are at a secure location near the site and are available.

5. SLAT Plan – A test plan that identifies all tests to be performed, associates the tests with the requirements, and describes the anticipated results has been developed and approved by Customs. Additionally, the plan shall contain include team member roles and responsibilities and a resource-loaded schedule (i.e. who will do what and when).

6. SLAT Team Training – The SLAT team members shall receive a briefing on the site-specific Concept of Operations (ConOps), communication system, system configuration, and the SLAT plan.

7. Hand-Held Equipment – All hand-held equipment is in country and verified operational.

8. RPM Functional Compliance Test – Staff have conducted functional compliance tests and all RPMs have passed. The current Functional Compliance Testing Data Sheet (or equivalent) has been fully filled out and filed with project files. RPMs are demonstrating stable operations.

9. All communications system components have been checked to ensure that they are working properly and communicating with the CAS system. The software contractor has conducted testing to ensure that the software is working properly and that the CAS interacts appropriately with each element of the deployed equipment.

10. Nuctech will resolve any system failures and prepare the Final SLAT Readiness Letter.

11. Hands-Off – The hands-off period has been completed successfully. The SLAT team will review data collected during this period to verify system readiness for official SLAT.

1.4 SLAT Roles and Responsibilities

1.4.1 Roles and Responsibilities

The following organizations have these specific responsibilities associated with this testing:

- The Site Manager has overall responsibility for the project. The Site Manager is responsible for determining the final acceptance of the system and for directing actions to be taken regarding deficiencies noted during the SLAT.
- The organization responsible for providing and controlling sources used during the acceptance test is Shanghai Institute of Measurement and Testing (SIMT) (or other group responsible for sources). SIMT has responsibility to assure that sources are available prior to the beginning of the SLAT.
- Country officials are welcome to observe the SLAT as time permits, will be aware that testing is being conducted, and may be called upon to provide logistical support (traffic control, etc) as required.
- Nuctech, as developer of the Communications System, will be available during SLAT to explain the system, assist with testing as needed, answer questions, and take notes to allow further investigation, issue identification, and resolution.
- Nuctech has primary responsibility for the installation of the infrastructure. Nuctech will provide documentation regarding status of construction activities in the form of a "construction punch list." Nuctech will also assist in coordinating interactions with local authorities if required.
- (Responsible organization) is responsible for assuring proper testing and calibration of the RPMs in coordination with Nuctech. (Responsible organization) will provide documentation regarding testing and setup of the RPMs.
- Nuctech is the manufacturer that provides the RPMs and will be on-site during RPM set-up.
- (Responsible organization) is responsible for overall project management, as well as training the users of the RPMs and associated equipment. (Responsible organization) also has overall responsibility for the SLAT Plan.
- (Responsible organization) is currently responsible for determining that the design meets the requirements documented in the Conceptual Design Document (CDD) (and other requirements documents), and performing and documenting the results of this SLAT and the resulting SLAT Report. Other entities may be assigned responsibility for this function on a case-by-case basis.

- SIMT or other (Responsible organization) is the entity licensed to handle sources at Site Name. SIMT will make the sources available at the port when needed, assist with use of the sources while on site, and return sources to secure storage at the offices or agreed upon location after their use.
- City Customs will be requested to assist with security, access, traffic control, and any other issues related to operation of the port.
- (Responsible organization) provides the CAS operators for SLAT. Designated operators shall assist with SLAT by operating CAS workstations under supervision of the SLAT Team. Other operators may observe as time and space permit.
- Other project participants involved with the project at Site Name are welcome to observe SLAT as time and space permits. Key personnel will be informed that testing is being conducted and may play essential roles in the testing process.

1.4.2 Test Roles

For the activities described in this document, the following specific roles are defined:

- **TEST DIRECTOR/POC** – the person designated by the Site Manager to be the point-of-contact (POC) for testing. This person is responsible for collecting the component tests documentation, for assuring that the SLAT is conducted and for getting the appropriate signatures on the SLAT documents. The insert name or his delegate will serve as the Test Director.
- **TEST CONDUCTOR** – Insert name(s) will be Test Conductors. The Test Conductors will be responsible for overseeing the documentation of the SLAT results and obtaining required signatures. The Test Conductors will develop a summary of the test as well as a SLAT Discrepancy Log that identifies those items that need to be reviewed by the Test Director.
- **CAS OPERATOR** – (Assigned personnel) will serve as the CAS/LAS/EVS/SWS Operator during the performance of the SLAT. The CAS operator may vary from day-to-day and will be designated during SLAT based on available staff in the field.
- **ALARM GENERATOR** – a qualified Customs representative, Nuctech employee, Nuctech sub-contractor will direct the generation of the system events. System events will be generated as necessary to perform the tests.
- **ALARM PANEL OPERATOR** – a designated individual will be responsible for observing the operation of the alarm panel and traffic lights during the SLAT. The Test Director will designate an individual to be the Alarm Panel Operator as necessary during the test.

1.5 Special Equipment Needs

For the activities described in this document, the following equipment is required:

- Gamma and neutron sources specified by Test Director;

- Radios, cellular phones, or walkie-talkies to allow communication between the Test Conductor, the Alarm Generator, and the Alarm Panel Operators; and
- Live traffic through vehicle lanes. (Vehicles should be available with multiple configurations, including trucks with a single 20-foot container, both front and back; trucks with a single 40-foot container; and trucks with dual 20-foot containers. If any of these configurations are not adequately represented by natural traffic, the Test Director will arrange a test truck with Local Customs to provide those configurations.)

The Test Director is responsible for working with the POC at each site to coordinate the availability of this equipment.

1.6 Safety and Operational Concerns

The Test Director is responsible for working with the Local Customs and Nuctech representatives to assure that local procedures are followed during the testing so that the safety of test personnel is ensured. In addition, the Test Director is responsible for coordinating with the local Nuctech representative and the local host government authorities to minimize the impact of the test activities on the normal operations at the site.

1.7 Alarm Handling During Testing

During the "hands-off" period and during the SLAT, response to alarms will be conducted in accordance with Local Customs policies and procedures. Any alarm handling procedures that are different from this guidance must be documented in this section of the SLAT Plan.

Appendix A Site Name Layout and Equipment Locations (insert appropriate drawings)

Site Name Layout

Equipment Locations at Site Name

Location	Vehicle Portal Monitors	OCR	Computer Workstations	Audio/Visual Alert Systems
Export Traffic Control Gate	xx	xx	x LAS workstations	x
Export Traffic Control Gate	x	xx	x EVS workstation	x
Local Customs Control Center (CAS)	x	x	x CAS workstations	x
Secondary Inspection Site	x	x	x SWS workstation	x
Exit Gate	x	x	x EVS workstation	x
Totals	xx	xx	x	x

Appendix B General Schedule and SLAT Staffing Plan

WEEK #1	Saturday Date	Sunday Date	Monday Date	Tuesday Date	Wednesday Date	Thursday Date	Friday Date
Primary Activity	**Hands-off**	**Hands-off**	**SLAT**	**SLAT**	**SLAT**	**SLAT**	**SLAT**
Live CAS?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Sources?	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Test Truck?	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Hand-helds?	**Local Customs**	**Local Customs**	**Local Customs**	**Local Customs**	**Local Customs**	**Local Customs**	**Local Customs**
Nuctech							
RPM expert	RPM Personnel	RPM Personnel	RPM Personnel	RPM Personnel	RPM Personnel	RPM Personnel	RPM Personnel
Test Conductor	Test Conductor Hands-off	Test Conductor Hands-off	Test Conductor conduct SLAT	Test Conductor conduct SLAT	Test Conductor conduct SLAT	Test Conductor conduct SLAT	Test Conductor conduct SLAT
PM	Test Director on site for Hands-Off	Test Director on site for Hands-Off	Test Director observes SLAT	Test Director observes SLAT	Test Director observes SLAT	Test Director on site for Hands-Off	Test Director on site for Hands-Off
Test Director		Site Manager arrives	Site Manager observes SLAT	Site Manager observes SLAT	Site Manager observes SLAT	Site Manager observes SLAT	Site Manager departs

Appendix C SLAT Readiness Review Checklist

Category	Prerequisite	Date Completed	Comments
General	Live truck traffic through RPMs		
	Port and Customs staff briefed and trained as needed		
	Local Customs has given permission to test		
	Sources and source-handling staff scheduled		
	Port access/passes arranged		
	Safety gear available for all participants		
	SLAT team coordination meeting completed		
	Approved SLAT plan in place		
Construction	Lane equipment adequately protected (bollards, barriers, etc.)		
	Speed control in place		
	Traffic control devices operable		
	Construction punch list reviewed, nothing critical remaining		
	Maintenance team on standby		
	SLAT readiness letter issued		
	RPMs aligned and functional		
	OCR integrated and functional		
	Fixed video cameras aligned and functional		
	SIS functional		
	Critical spare parts available		

Category	Prerequisite	Date Completed	Comments
Communications	Communications equipment available and tested among all test participants (walkie-talkies, radio, cell phones)		
	CAS communicates with all RPMs		
	Lane alarm signal lights functional		
	VOIP phones installed and functional		
	Integration and system test failures corrected or characterized		
	Software for hand-helds installed and tested if applicable		
	System stable through hands-off period		

Appendix D SLAT Alarm Assessment

In the event of a neutron alarm, the most effective way to assess the validity of the alarm is to pass the vehicle, container, or person through an RPM a second time. If a second alarm is generated, it must be determined whether a legal, documented neutron source was manifested. The proper documentation should accompany the shipment and the identified neutron source and documentation should be consistent. It is important to note that any legal, legitimate movement or transport of a neutron source is accompanied by internationally recognized documents. If an alarm is not generated on the second pass, the alarm is closed out.

Appendix E SLAT Team Contact List

Name	Position	International Cell Phone
Name-organization	Site Manager	
Name-organization	Test Director	
Name-organization	Test Conductor	
Name-organization	Test Conductor	
Name-organization	Contractor Lead	
Name-organization	Other personnel	
Name-organization	Other personnel	
Name-organization	Other personnel	

Appendix F Local Customs SLAT Team Contact List

Name	Position	Phone

Appendix G SNL Test Plan

SLAT Team staff will conduct SLAT at Site Name, City, Country in Date. Name(s) will serve as Test Conductors.

H.1 Component and Interface Testing

Purpose: The majority of the testing of individual components and interfaces between systems is expected to be conducted during installation by the organizations responsible for the various components. However, if the Test Director and SLAT team, at the conclusion of the Readiness Review, determine that preparations are inadequate, testing is not clearly understood or is not properly documented, the SLAT team may independently conduct additional tests of the vendor supplied equipment. The Test Director and Test Conductor may request assistance by the vendor/installer in conducting any portions of the previous tests for any of the following reasons:

- Unclear documentation regarding the vendor testing,
- As a demonstration for the SLAT team to become more familiar with the system,
- If any changes have been made after the vendor testing,
- Vendor's test plan does not adequately test the requirements, and
- Any other reason deemed necessary by the Test Director and approved by the Site Manager.

Documentation of Component and Interface Testing: The documentation for this section will consist of copies of the portions of the vendor supplied test plans that the SLAT team determines are necessary to repeat/witness independently or summaries of the tests performed and results.

H.2 System-Based Testing

Purpose: To assure that end-to-end functionality is achieved for the entire system.

Summary: The testing will consist of operational scenarios based on the Communications Test Plan and under normal operating conditions. These tests are to be conducted with actual vehicles carrying containers. This may include equipment selected specifically for testing, provided by the port with data created specifically for the test or may include actual traffic. Generation of alarms may be done by happenstance (if an actual alarm occurs during the test) or may require (responsible personnel) to hold a source in the detection zone while traffic uses the lane, or may require inserting a source within a container or truck during testing. Other test personnel will be stationed at the CAS. The goal is to follow the test scenario through the entire process – from passage of the container through the RPM lane area and into the terminal, assuring that all integrated systems reflect the proper status for the container at each point during the scenario.

The following table identifies the full set of tests that will be conducted. A specific alarm scenario can be identified by the code provided in the appropriate row and column of the table.

Notes:

1. Test Director and the SLAT team will determine the number of tests to be conducted, assuring that a variety of expected conditions are tested so that there is reasonable assurance that the system operates properly in accordance with the design and the SOPs.

2. For a 100% test, each of the RPM lanes would be tested for each scenario. The Test Director/Conductor will assure that testing is spread between the lanes.

3. For a 100% test, each of these scenarios would have to be tested for a Neutron-Gamma Pair Alarm, for a Neutron Alarm, and for a Gamma Alarm. The Test Director/Conductor will vary testing to assure a range of alarm types are covered.

4. Of the possible tests in each lane, the Test Conductor will determine the number of tests to conduct.

5. As each test is conducted, the results will be recorded in test plan documentation.

H.3 Schedule

SLAT will test the entire system. SLAT is currently scheduled to run (dates). A daily schedule is provided below, and a staffing plan is provided in Appendix B. The SLAT daily and hourly schedule will be established by the Test Director. A detailed schedule for each day has not been established for this plan since the schedule will depend on many factors that can only be evaluated during the SLAT process.

The preliminary testing schedule is laid out in the following paragraphs. The testing schedule cannot be firmly fixed at this time because it depends upon the availability of container traffic. This traffic is unpredictable and the team needs to be flexible to perform scheduled activities when container traffic is available.

Date

SLAT team training will be conducted on a teleconference. Should members of the team who will be on site for SLAT miss the teleconference, they will receive a separate briefing on site by the Test Conductor or his delegate.

Prior to SLAT

Test Director and Test Conductor(s) will meet with the lead CAS operator to coordinate SLAT activities and required Chinese support.

Date

SLAT officially begins. Test Conductor(s) will conduct a formal inspection of the physical infrastructure, accompanied by Test Director and Nuctech staff.

Prior to SLAT

The testing schedule for the week will reflect the following:

Vehicle traffic through the vehicle lanes should be fairly regular Monday through Friday. These tests can be performed with the greatest schedule flexibility. Live traffic may need to be supplemented with the use of the test truck.

The only natural traffic through Site Name secondary inspection site (SIS) would be investigation of alarming containers. If this "natural traffic" is inadequate, some of the testing will require rerouting of non-alarming trucks through the lane (with support provided by CAS staff) and/or use of the test truck.

Container traffic will need to be routed through each of the lanes on the port. (This will require coordination with Local Customs staff, who will instruct their drivers to proceed through the desired RPMs.) If this "natural traffic" is inadequate, some of the testing will require use of the test truck.

Testing of the CAS workstations outside the CAS (LAS, EVS, and SWS) will require some coordination with the occupants of those buildings.

H.4 Test Truck

Local Customs has been notified that the SLAT team requires a test truck to stage vehicle/container configurations that are not adequately covered by natural port traffic. Local Customs has been advised to make the truck available, with all four possible configurations (1x40', 1x20' front, 1x20' back, and 2x20 and a tractor pulled container 2x20') on Wednesday and Friday. However, unforeseen circumstances may necessitate the use of the truck at other times.

H.5 Test Configurations

The SLAT configurations are provided in the tables below entitled *SLAT Plan Scenarios*. Due to time and resource constraints, all of the configurations will not be realized. However, Test Conductor staff will ensure that there is adequate testing to ensure reliable performance at each lane.

Installation Inspection Checklist

Item	Topic to Review	Remaining Work To Be Completed	Required to be Completed before Testing Begins?	Date Reviewed/ Photos taken	Responsible Party/ Representative	Reviewers
Nuctech Items						
All construction	Get copy of test plan/checklist and any punch list.					
Export Lanes	RPMs (including foundations, paint, bollards, wiring, mounting, signage, cameras, etc) installed, operational and integrated with the CAS system.					
	OCR systems installed, operational, and integrated with the CAS system.					
CAS Office	Complete CAS workstations (including maintenance workstation and all CAS software), server, and phones installed and operational.					
	Get copy of completed CAS system test plan and identify any incomplete items.					
	CAS system interface to RPMs tested.					
	Wiring and network connections complete.					
	UPS replaced.					

Item	Topic to Review	Remaining Work To Be Completed	Required to be Completed before Testing Begins?	Date Reviewed/ Photos taken	Responsible Party/ Representative	Reviewers
(Secondary Inspection Area)	Hand-held equipment (including storage enclosure and charging stations) installed and operational. Inspection platforms installed.					
LAS Workstations	Complete LAS workstations (including maintenance workstation and all LAS software), server, and phones installed and operational.					
EVS Workstations	Complete EVS workstations (including maintenance workstation and all EVS software), server, and phones installed and operational.					
RPM expert/Nuctech Items						
RPMs	Get copy of RPM expert test results for RPMs.					
Port Items						

SNL SLAT Plan Scenarios

	Lane 001--	Lane 002--	Lane 003--	Lane 004--	Lane 005--	Lane 006--
No.	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**
1	L1-X-40	L2-X-40	L3-X-40	L4-X-40	L5-X-40	L6-X-40
2	L1-X-20 Front	L2-X-20 Front	L3-X-20 Front	L4-X-20 Front	L5-X-20 Front	L6-X-20 Front
3	L1-X-20 Back	L2-X-20 Back	L3-X-20 Back	L4-X-20 Back	L5-X-20 Back	L6-X-20 Back
4	L1-X-20F/20B	L2-X-20F/20B	L3-X-20F/20B	L4-X-20F/20B	L5-X-20F/20B	L6-X-20F/20B
5	L1-X-chassis only	L2-X-chassis only	L3-X-chassis only	L4-X-chassis only	L5-X-chassis only	L6-X-chassis only
	Gamma Alarm	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**
6	L1-G-40	L2-G-40	L3-G-40	L4-G-40	L5-G-40	L6-G-40
7	L1-G-20 Front	L2-G-20 Front	L3-G-20 Front	L4-G-20 Front	L5-G-20 Front	L6-G-20 Front
8	L1-G-20 Back	L2-G-20 Back	L3-G-20 Back	L4-G-20 Back	L5-G-20 Back	L6-G-20 Back
9	L1-G-20F/20B	L2-G-20F/20B	L3-G-20F/20B	L4-G-20F/20B	L5-G-20F/20B	L6-G-20F/20B
10	L1-G-chassis only	L2-G-chassis only	L3-G-chassis only	L4-G-chassis only	L5-G-chassis only	L6-G-chassis only
	Neutron Alarm	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**
11	L1-N-40	L2-N-40	L3-N-40	L4-N-40	L5-N-40	L6-N-40
12	L1-N-20 Front	L2-N-20 Front	L3-N-20 Front	L4-N-20 Front	L5-N-20 Front	L6-N-20 Front
13	L1-N-20 Back	L2-N-20 Back	L3-N-20 Back	L4-N-20 Back	L5-N-20 Back	L6-N-20 Back
14	L1-N-20F/20B	L2-N-20F/20B	L3-N-20F/20B	L4-N-20F/20B	L5-N-20F/20B	L6-N-20F/20B
15	L1-N-chassis only	L2-N-chassis only	L3-N-chassis only	L4-N-chassis only	L5-N-chassis only	L6-N-chassis only
	Neutron + Gamma	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**
16	L1-NG-40	L2-NG-40	L3-NG-40	L4-NG-40	L5-NG-40	L6-NG-40
17	L1-NG-20 Front	L2-NG-20 Front	L3-NG-20 Front	L4-NG-20 Front	L5-NG-20 Front	L6-NG-20 Front
18	L1-NG-20 Back	L2-NG-20 Back	L3-NG-20 Back	L4-NG-20 Back	L5-NG-20 Back	L6-NG-20 Back
19	L1-NG-20F/20B	L2-NG-20F/20B	L3-NG-20F/20B	L4-NG-20F/20B	L5-NG-20F/20B	L6-NG-20F/20B
20	L1-NG-chassis only	L2-NG-chassis only	L3-NG-chassis only	L4-NG-chassis only	L5-NG-chassis only	L6-NG-chassis only

	Lane 007--	Lane 008--	Lane 009--	Lane 010--	Lane 011--	Lane 012--
No.	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**
1	L1-X-40	L2-X-40	L3-X-40	L4-X-40	L5-X-40	L5-X-40
2	L1-X-20 Front	L2-X-20 Front	L3-X-20 Front	L4-X-20 Front	L5-X-20 Front	L5-X-20 Front
3	L1-X-20 Back	L2-X-20 Back	L3-X-20 Back	L4-X-20 Back	L5-X-20 Back	L5-X-20 Back
4	L1-X-20F/20B	L2-X-20F/20B	L3-X-20F/20B	L4-X-20F/20B	L5-X-20F/20B	L5-X-20F/20B
5	L1-X-chassis only	L2-X-chassis only	L3-X-chassis only	L4-X-chassis only	L5-X-chassis only	L5-X-chassis only
	Gamma Alarm	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**
6	L1-G-40	L2-G-40	L3-G-40	L4-G-40	L5-G-40	L5-G-40
7	L1-G-20 Front	L2-G-20 Front	L3-G-20 Front	L4-G-20 Front	L5-G-20 Front	L5-G-20 Front
8	L1-G-20 Back	L2-G-20 Back	L3-G-20 Back	L4-G-20 Back	L5-G-20 Back	L5-G-20 Back
9	L1-G-20F/20B	L2-G-20F/20B	L3-G-20F/20B	L4-G-20F/20B	L5-G-20F/20B	L5-G-20F/20B
10	L1-G-chassis only	L2-G-chassis only	L3-G-chassis only	L4-G-chassis only	L5-G-chassis only	L5-G-chassis only
	Neutron Alarm	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**
11	L1-N-40	L2-N-40	L3-N-40	L4-N-40	L5-N-40	L5-N-40
12	L1-N-20 Front	L2-N-20 Front	L3-N-20 Front	L4-N-20 Front	L5-N-20 Front	L5-N-20 Front
13	L1-N-20 Back	L2-N-20 Back	L3-N-20 Back	L4-N-20 Back	L5-N-20 Back	L5-N-20 Back
14	L1-N-20F/20B	L2-N-20F/20B	L3-N-20F/20B	L4-N-20F/20B	L5-N-20F/20B	L5-N-20F/20B
15	L1-N-chassis only	L2-N-chassis only	L3-N-chassis only	L4-N-chassis only	L5-N-chassis only	L5-N-chassis only
	Neutron + Gamma	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**
16	L1-NG-40	L2-NG-40	L3-NG-40	L4-NG-40	L5-NG-40	L5-NG-40
17	L1-NG-20 Front	L2-NG-20 Front	L3-NG-20 Front	L4-NG-20 Front	L5-NG-20 Front	L5-NG-20 Front
18	L1-NG-20 Back	L2-NG-20 Back	L3-NG-20 Back	L4-NG-20 Back	L5-NG-20 Back	L5-NG-20 Back
19	L1-NG-20F/20B	L2-NG-20F/20B	L3-NG-20F/20B	L4-NG-20F/20B	L5-NG-20F/20B	L5-NG-20F/20B
20	L1-NG-chassis only	L2-NG-chassis only	L3-NG-chassis only	L4-NG-chassis only	L5-NG-chassis only	L5-NG-chassis only

	Lane 013--	Lane 014--	Lane 015--	Lane 016--	Lane 017--	Lane 018--
No.	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**	**No Alarm**
1	L1-X-40	L2-X-40	L3-X-40	L4-X-40	L5-X-40	L5-X-40
2	L1-X-20 Front	L2-X-20 Front	L3-X-20 Front	L4-X-20 Front	L5-X-20 Front	L5-X-20 Front
3	L1-X-20 Back	L2-X-20 Back	L3-X-20 Back	L4-X-20 Back	L5-X-20 Back	L5-X-20 Back
4	L1-X-20F/20B	L2-X-20F/20B	L3-X-20F/20B	L4-X-20F/20B	L5-X-20F/20B	L5-X-20F/20B
5	L1-X-chassis only	L2-X-chassis only	L3-X-chassis only	L4-X-chassis only	L5-X-chassis only	L5-X-chassis only
	Gamma Alarm	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**	**Gamma Alarm**
6	L1-G-40	L2-G-40	L3-G-40	L4-G-40	L5-G-40	L5-G-40
7	L1-G-20 Front	L2-G-20 Front	L3-G-20 Front	L4-G-20 Front	L5-G-20 Front	L5-G-20 Front
8	L1-G-20 Back	L2-G-20 Back	L3-G-20 Back	L4-G-20 Back	L5-G-20 Back	L5-G-20 Back
9	L1-G-20F/20B	L2-G-20F/20B	L3-G-20F/20B	L4-G-20F/20B	L5-G-20F/20B	L5-G-20F/20B
10	L1-G-chassis only	L2-G-chassis only	L3-G-chassis only	L4-G-chassis only	L5-G-chassis only	L5-G-chassis only
	Neutron Alarm	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**	**Neutron Alarm**
11	L1-N-40	L2-N-40	L3-N-40	L4-N-40	L5-N-40	L5-N-40
12	L1-N-20 Front	L2-N-20 Front	L3-N-20 Front	L4-N-20 Front	L5-N-20 Front	L5-N-20 Front
13	L1-N-20 Back	L2-N-20 Back	L3-N-20 Back	L4-N-20 Back	L5-N-20 Back	L5-N-20 Back
14	L1-N-20F/20B	L2-N-20F/20B	L3-N-20F/20B	L4-N-20F/20B	L5-N-20F/20B	L5-N-20F/20B
15	L1-N-chassis only	L2-N-chassis only	L3-N-chassis only	L4-N-chassis only	L5-N-chassis only	L5-N-chassis only
	Neutron + Gamma	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**	**Neutron + Gamma**
16	L1-NG-40	L2-NG-40	L3-NG-40	L4-NG-40	L5-NG-40	L5-NG-40
17	L1-NG-20 Front	L2-NG-20 Front	L3-NG-20 Front	L4-NG-20 Front	L5-NG-20 Front	L5-NG-20 Front
18	L1-NG-20 Back	L2-NG-20 Back	L3-NG-20 Back	L4-NG-20 Back	L5-NG-20 Back	L5-NG-20 Back
19	L1-NG-20F/20B	L2-NG-20F/20B	L3-NG-20F/20B	L4-NG-20F/20B	L5-NG-20F/20B	L5-NG-20F/20B
20	L1-NG-chassis only	L2-NG-chassis only	L3-NG-chassis only	L4-NG-chassis only	L5-NG-chassis only	L5-NG-chassis only

Appendix H SLAT Discrepancy Log

After SLAT is complete, the test director will summarize test findings on a SLAT Discrepancy Log. The log will identify any test results that fail to meet the integrated system requirements or require additional testing and evaluation.

Site: _____ Prepared by: _____ Date: _____

Test Section	**Short Summary of Issue** (hardware not ready, software change needed, other)	Reference Requirement	**Responsible** (who has to confirm when ready for retest)	Recommended Solution	Priority	Predicted Retest Date

Appendix I Alarm Initiation Procedures for RPM Testing (This may vary for identification-type RPMs, highlighted lines may not be applicable for Nuctech RPMs) (add any test procedures desired for SLAT)

Neutron-Gamma Pair Alarm – initiate and maintain an occupancy by interrupting the beam of the occupancy sensor. Hold the neutron-gamma (e.g. Cf-252 source (with no shielding)) near the front of the primary or subordinate cabinet. This should generate a NG Pair Alarm. Alternatively, hold both types of sources (gamma [e.g. Cs-137 or Co57] and neutron [e.g. Cf-252]) near the front of the primary or subordinate cabinet while maintaining an occupancy.

Neutron Alarm – initiate and maintain an occupancy by interrupting the beam of the occupancy sensor. Hold the neutron (e.g. Cf-252 source) near the front of the primary or subordinate cabinet. Note: A Gamma Alarm may also occur during this step. If this is unacceptable, either shield the gamma radiation from the source or temporarily disable the gamma detectors.

Gamma Alarm – initiate and maintain an occupancy by interrupting the beam of the occupancy sensor. Hold the gamma (e.g.Cs-137 or Co-57) source near the front of the primary or subordinate cabinet.

Neutron Hi (background) – Hold the neutron (e.g. Cf-252) source near the front of either the primary or subordinate cabinet without initiating an occupancy. A Gamma Hi alarm may also occur during this step. If this is unacceptable, either shield the gamma radiation from the source, or temporarily disable the gamma detectors.

Gamma Hi (background) – Hold the gamma (e.g.Cs-137 or Co-57) source near the front of either the primary or subordinate cabinet without initiating an occupancy.

Gamma Lo (background) – with the tamper switch defeated and cabinet open, disconnect the SIGNAL cable from any of the plastic scintillators. This can be done on the detector itself or at the control box. Depending on the alarm set point and background radiation levels, more than one scintillator may have to be disconnected. Take care not to disconnect a high-voltage connector while the system is energized.

Tamper Alarm – There are several ways to create a Tamper Alarm. It is not possible to determine from the CAS display which of the following events caused the Tamper Alarm.

Tamper (RPM) - Open the cabinet of an operating RPM.

Tamper (Junction Box) – In some installations, the nearby junction box also has a tamper wired to the same contacts as the RPM tamper. Open the junction box door.

Tamper (Loss of AC) – Alternating current power to an operating RPM must be disconnected. De-energize the RPM by opening the dedicated breaker inside of its associated utility panel.